



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5 CHICAGO REGIONAL LABORATORY
536 SOUTH CLARK STREET
CHICAGO, ILLINOIS 60605



Date: 1/21/2015
Subject: Review of Region 5 Data for BP Whiting Refinery
To: Air Division, US EPA Region 5
77 West Jackson Boulevard
Chicago, IL 60605
From: Wayne Whipple, Analyst
US EPA Region 5 Chicago Regional Laboratory

The data transmitted under this cover memo successfully passed CRL's data review procedures as documented in the current Quality Management Plan and applicable Standard Operating Procedures. In accordance with EPA's *Guidance on Environmental Data Verification and Data Validation* (Document EPA QA/G-8), CRL verified and validated the data but does not perform data quality assessment based on project plans.

This report was reviewed and the information provided herein accurately represents the analysis performed.

X

21 Jan 2015

Please contact the analyst with any technical report issues, Amanda Wroble at (312)-353-0375 for sample project concerns, and Sylvia Griffin at (312)-353-9073 with data transmittal questions. Thank you.

Attached are Results for: BP Whiting Refinery

Data Management Coordinator and Date Transmitted

Analyses included in this report:

Air Toxics Reimer 5



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Air Division, US EPA Region 5
77 West Jackson Boulevard
Chicago IL, 60605

Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-21-15 11:50

Analysis Case Narrative for Volatile Organic Compounds (VOC) Air Toxics

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General Information

Three 15 L canisters and two six liter canisters were received in good condition from the Air and Radiation Division monitoring group on October 16, 2014. The samples met hold time.

The samples were analyzed for VOC Air Toxics using SOP MS-005 Revision 6 with cold trap dehydration preconcentrator on Pegasus. (Reference Method US EPA TO-15). There are three pen and ink changes to the SOP, MS-005 r6 PI01, 02, 03 that allow for using the LECO manufacture tune recommendations for tune criteria, allowing the use of the Pegasus instruments and an updated compound list from the available standards and the last change updates the sample monitoring compounds to current concentrations and extends the acceptance limits to the analytical limits.

Data are reported to a reporting limit of 25 pptv and at least 35 pptv was requested in the Quality Assurance Project Plan, QAPP "Passive Tube Canister Comparison Study_QAPP 082514"

Standard Operating Procedures (SOP) and Method Deviations

The criteria used for determining if system contamination influences the sample results is for a sample result to be over three to five times the contamination in the method blank or the canister certification check blank..

The LCS limits are taken from the SOP and not the LIMS limits. The LIMS limits are for tracking purposes only.

Sample Analysis and Results

Propene is a combination of propane and propene that cannot be resolved. The compounds is flagged K as a high bias.

Propene, dichlorotetrafluoroethane, 1,1,2-trichloro-1,2,2-trifluoromethane, cyclohexane, 2-butanone, and acetone have their reporting limit raised to 50 pptv because the calibration curve lowest reporting limit was not acceptable up to the 50 pptv calibration level.

Acrolein and 1,3 butadiene are flagged high bias because of interferences from hydrocarbons in all the samples that



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cannot be resolved. It is very likely the results are a large overestimate.

Methylene chloride is present in the canister certification blank at half the concentration reported and therefore may have a high bias from canister contamination for samples -01, -02 and -03. The analyte is flagged K for high bias for that sample.

Acetone was reported from the diluted samples in all samples except -03. The results of these compounds in the sample duplicate are reported from the undiluted sample and are estimated.

Naphthalene is present in all the canister certification blanks but since the compound is already flagged as estimated no further qualifications are necessary.

4-Ethyltoluene appears to be coeluting with an unknown aromatic hydrocarbon that has a similar mass spectrum. The peak is asymmetric suggesting the coelution. The result is reported as 4-ethyl toluene but with a K flag suggesting a high bias from the coelution. The unknown suspected compound is most likely a similar aromatic hydrocarbon.

Quality Control

Isopropyl alcohol failed calibration and is flagged J as estimated.

Ethanol, acetone, acrolein and naphthalene failed a continuing calibration and is flagged J in all samples.

Naphthalene is flagged as estimated because the performance of the analytical system is not as reliable having an acceptable calibration response above 250 pptv for that late eluting compound and it fails the second source calibration check (ICV).

Dichlorotetrafluoroethane and 1,1,1-trichloroethane is reported below the reporting and/or detection limit for tracking of the sample monitoring compound. The result is within the expected global results, although is still flagged. The result is also within 5 times the blank result but it is already flagged as estimated so no further action is required.

Carbon disulfide is rejected because of poor analytical performance.

4-Methyl-2-pentanone Is flagged K, high bias because the concentration in the samples are within a factor of 5 from the concentration detected in the method blank.



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ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
4	1410020-01	Air	Oct-16-14 08:40	Oct-16-14 11:00
1	1410020-02	Air	Oct-16-14 09:20	Oct-16-14 11:00
3	1410020-03	Air	Oct-16-14 10:00	Oct-16-14 11:00
2	1410020-04	Air	Oct-16-14 10:30	Oct-16-14 11:00
2	1410020-05	Air	Oct-16-14 10:30	Oct-16-14 11:00



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Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

4 (1410020-01) Air Sampled: Oct-16-14 08:40 Received: Oct-16-14 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Propene	1.08	K		0.0500	ppbv	1	B410068	Oct-16-14	Oct-16-14
Chloromethane	0.532			0.0250	"	"	"	"	"
Vinyl chloride	U			0.0250	"	"	"	"	"
1,3-butadiene	0.0406	K		0.0250	"	"	"	"	"
Bromomethane	U			0.0250	"	"	"	"	"
Chloroethane	U			0.0250	"	"	"	"	"
Ethanol	1.36	J		0.0250	"	"	"	"	"
Acrolein	0.516	J, K		0.0250	"	"	"	"	"
1,1-Dichloroethene	U			0.0250	"	"	"	"	"
Methylene chloride	0.134	BC		0.0250	"	"	"	"	"
Carbon disulfide	Rejected			0.0250	"	"	"	"	"
Methyl tert-butyl ether	U			0.0250	"	"	"	"	"
1,1-Dichloroethane	U			0.0250	"	"	"	"	"
Vinyl acetate	U			0.0250	"	"	"	"	"
Hexane	0.307			0.0250	"	"	"	"	"
2-Butanone	0.339			0.0500	"	"	"	"	"
cis-1,2-Dichloroethene	U			0.0250	"	"	"	"	"
trans-1,2-Dichloroethene	U			0.0250	"	"	"	"	"
Chloroform	0.0268			0.0250	"	"	"	"	"
Ethyl acetate	0.157			0.0250	"	"	"	"	"
1,2-Dichloroethane	U			0.0250	"	"	"	"	"
Cyclohexane	0.195			0.0500	"	"	"	"	"
Tetrahydrofuran	U			0.0250	"	"	"	"	"
Benzene	0.235			0.0250	"	"	"	"	"
n-Heptane	0.136			0.0250	"	"	"	"	"
1,2-Dichloropropane	U			0.0250	"	"	"	"	"
Trichloroethene	U			0.0250	"	"	"	"	"
Bromodichloromethane	U			0.0250	"	"	"	"	"
Methyl methacrylate	U			0.0250	"	"	"	"	"
1,4-Dioxane	U			0.0250	"	"	"	"	"
cis-1,3-Dichloropropene	U			0.0250	"	"	"	"	"
4-Methyl-2-pentanone	0.0420	K		0.0250	"	"	"	"	"
trans-1,3-Dichloropropene	U			0.0250	"	"	"	"	"
1,1,2-Trichloroethane	U			0.0250	"	"	"	"	"
Dibromochloromethane	U			0.0250	"	"	"	"	"



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4 (1410020-01) Air Sampled: Oct-16-14 08:40 Received: Oct-16-14 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Toluene	0.450			0.0250	ppbv	1	B410068	Oct-16-14	Oct-16-14
2-Hexanone	U			0.0250	"	"	"	"	"
1,2-Dibromoethane (EDB)	U			0.0250	"	"	"	"	"
Tetrachloroethene	U			0.0250	"	"	"	"	"
Chlorobenzene	U			0.0250	"	"	"	"	"
Ethylbenzene	0.0528			0.0250	"	"	"	"	"
m+p-Xylene	0.162	BC		0.0500	"	"	"	"	"
Bromoform	U			0.0250	"	"	"	"	"
Styrene	0.0256			0.0250	"	"	"	"	"
1,1,2,2-Tetrachloroethane	U			0.0250	"	"	"	"	"
o-Xylene	0.0604			0.0250	"	"	"	"	"
4-ethyltoluene	0.0558	K		0.0250	"	"	"	"	"
1,3,5-Trimethylbenzene	U			0.0250	"	"	"	"	"
1,2,4-Trimethylbenzene	0.0529			0.0250	"	"	"	"	"
1,3-Dichlorobenzene	U			0.0250	"	"	"	"	"
Benzyl chloride	U			0.0250	"	"	"	"	"
1,4-Dichlorobenzene	U			0.0250	"	"	"	"	"
1,2-Dichlorobenzene	U			0.0250	"	"	"	"	"
Hexachlorobutadiene	U			0.0250	"	"	"	"	"
1,2,4-Trichlorobenzene	U			0.0250	"	"	"	"	"
Naphthalene	0.622	BC, J		0.0250	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
Surrogate: Dichlorodifluoromethane	0.512	J	97%	90-120	"	"	"
Surrogate: Dichlorotetrafluoroethane	0.0227	J	114%	80-120	"	"	"
Surrogate: Trichlorofluoromethane	0.241		101%	90-120	"	"	"
Surrogate: 1,1,2-trichloro-1,2,2-trifluoroethane (F)	0.0870		119%	90-120	"	"	"
Surrogate: 1,1,1-Trichloroethane	3.83E-3	J	77%	80-120	"	"	"
Surrogate: Carbon tetrachloride	0.0884		103%	80-120	"	"	"



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Air Toxics by GC/MS, EPA TO-15 (modified)
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4 (1410020-01RE1) Air Sampled: Oct-16-14 08:40 Received: Oct-16-14 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Isopropyl alcohol	4.08	J		0.125	ppbv	5	B410068	Oct-16-14	Oct-16-14
Acetone	3.61	J		0.250	"	"	"	"	"

1 (1410020-02) Air Sampled: Oct-16-14 09:20 Received: Oct-16-14 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Propene	1.37	K		0.0500	ppbv	1	B410068	Oct-16-14	Oct-16-14
Chloromethane	0.582			0.0250	"	"	"	"	"
Vinyl chloride	U			0.0250	"	"	"	"	"
1,3-butadiene	0.0440	K		0.0250	"	"	"	"	"
Bromomethane	U			0.0250	"	"	"	"	"
Chloroethane	U			0.0250	"	"	"	"	"
Ethanol	1.02	J		0.0250	"	"	"	"	"
Acrolein	0.688	J, K		0.0250	"	"	"	"	"
Isopropyl alcohol	0.530	J		0.0250	"	"	"	"	"
1,1-Dichloroethene	U			0.0250	"	"	"	"	"
Methylene chloride	0.110	BC		0.0250	"	"	"	"	"
Carbon disulfide	Rejected			0.0250	"	"	"	"	"
Methyl tert-butyl ether	U			0.0250	"	"	"	"	"
1,1-Dichloroethane	U			0.0250	"	"	"	"	"
Vinyl acetate	U			0.0250	"	"	"	"	"
Hexane	0.480			0.0250	"	"	"	"	"
2-Butanone	0.280			0.0500	"	"	"	"	"
cis-1,2-Dichloroethene	U			0.0250	"	"	"	"	"
trans-1,2-Dichloroethene	U			0.0250	"	"	"	"	"
Chloroform	U			0.0250	"	"	"	"	"
Ethyl acetate	0.0981			0.0250	"	"	"	"	"
1,2-Dichloroethane	U			0.0250	"	"	"	"	"
Cyclohexane	0.476			0.0500	"	"	"	"	"
Tetrahydrofuran	U			0.0250	"	"	"	"	"
Benzene	0.286			0.0250	"	"	"	"	"
n-Heptane	0.332			0.0250	"	"	"	"	"
1,2-Dichloropropane	U			0.0250	"	"	"	"	"
Trichloroethene	U			0.0250	"	"	"	"	"
Bromodichloromethane	U			0.0250	"	"	"	"	"



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1 (1410020-02) Air Sampled: Oct-16-14 09:20 Received: Oct-16-14 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Methyl methacrylate	U			0.0250	ppbv	1	B410068	Oct-16-14	Oct-16-14
1,4-Dioxane	U			0.0250	"	"	"	"	"
cis-1,3-Dichloropropene	U			0.0250	"	"	"	"	"
4-Methyl-2-pentanone	0.0681	K		0.0250	"	"	"	"	"
trans-1,3-Dichloropropene	U			0.0250	"	"	"	"	"
1,1,2-Trichloroethane	U			0.0250	"	"	"	"	"
Dibromochloromethane	U			0.0250	"	"	"	"	"
Toluene	0.610			0.0250	"	"	"	"	"
2-Hexanone	U			0.0250	"	"	"	"	"
1,2-Dibromoethane (EDB)	U			0.0250	"	"	"	"	"
Tetrachloroethene	U			0.0250	"	"	"	"	"
Chlorobenzene	U			0.0250	"	"	"	"	"
Ethylbenzene	0.0836			0.0250	"	"	"	"	"
m+p-Xylene	0.269			0.0500	"	"	"	"	"
Bromoform	U			0.0250	"	"	"	"	"
Styrene	U			0.0250	"	"	"	"	"
1,1,2,2-Tetrachloroethane	U			0.0250	"	"	"	"	"
o-Xylene	0.0976			0.0250	"	"	"	"	"
4-ethyltoluene	0.0883	K		0.0250	"	"	"	"	"
1,3,5-Trimethylbenzene	0.0295			0.0250	"	"	"	"	"
1,2,4-Trimethylbenzene	0.0950			0.0250	"	"	"	"	"
1,3-Dichlorobenzene	U			0.0250	"	"	"	"	"
Benzyl chloride	U			0.0250	"	"	"	"	"
1,4-Dichlorobenzene	U			0.0250	"	"	"	"	"
1,2-Dichlorobenzene	U			0.0250	"	"	"	"	"
Hexachlorobutadiene	U			0.0250	"	"	"	"	"
1,2,4-Trichlorobenzene	U			0.0250	"	"	"	"	"
Naphthalene	0.679	BC, J		0.0250	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
Surrogate: Dichlorodifluoromethane	0.492	J	94%	90-120	"	"	"
Surrogate: Dichlorotetrafluoroethane	0.0224	J	112%	80-120	"	"	"
Surrogate: Trichlorofluoromethane	0.234		98%	90-120	"	"	"
Surrogate: 1,1,2-trichloro-1,2,2-trifluoroethane (F)	0.0845		116%	90-120	"	"	"
Surrogate: 1,1,1-Trichloroethane	4.08E-3	J	82%	80-120	"	"	"
Surrogate: Carbon tetrachloride	0.0906		105%	80-120	"	"	"



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1 (1410020-02RE1) Air Sampled: Oct-16-14 09:20 Received: Oct-16-14 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Acetone	2.62	J		0.250	ppbv	5	B410068	Oct-16-14	Oct-16-14

3 (1410020-03) Air Sampled: Oct-16-14 10:00 Received: Oct-16-14 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Propene	1.48	K		0.0500	ppbv	1	B410068	Oct-16-14	Oct-16-14
Chloromethane	0.502			0.0250	"	"	"	"	"
Vinyl chloride	U			0.0250	"	"	"	"	"
1,3-butadiene	0.0459	K		0.0250	"	"	"	"	"
Bromomethane	U			0.0250	"	"	"	"	"
Chloroethane	U			0.0250	"	"	"	"	"
Ethanol	0.881	J		0.0250	"	"	"	"	"
Acrolein	0.410	J, K		0.0250	"	"	"	"	"
Isopropyl alcohol	0.271	J		0.0250	"	"	"	"	"
Acetone	1.88	J		0.0500	"	"	"	"	"
1,1-Dichloroethene	U			0.0250	"	"	"	"	"
Methylene chloride	0.101	BC		0.0250	"	"	"	"	"
Carbon disulfide	Rejected			0.0250	"	"	"	"	"
Methyl tert-butyl ether	U			0.0250	"	"	"	"	"
1,1-Dichloroethane	U			0.0250	"	"	"	"	"
Vinyl acetate	U			0.0250	"	"	"	"	"
Hexane	0.253			0.0250	"	"	"	"	"
2-Butanone	0.245			0.0500	"	"	"	"	"
cis-1,2-Dichloroethene	U			0.0250	"	"	"	"	"
trans-1,2-Dichloroethene	U			0.0250	"	"	"	"	"
Chloroform	0.0312			0.0250	"	"	"	"	"
Ethyl acetate	0.105			0.0250	"	"	"	"	"
1,2-Dichloroethane	U			0.0250	"	"	"	"	"
Cyclohexane	0.266			0.0500	"	"	"	"	"
Tetrahydrofuran	U			0.0250	"	"	"	"	"
Benzene	0.208			0.0250	"	"	"	"	"
n-Heptane	0.138			0.0250	"	"	"	"	"
1,2-Dichloropropane	U			0.0250	"	"	"	"	"
Trichloroethene	U			0.0250	"	"	"	"	"
Bromodichloromethane	U			0.0250	"	"	"	"	"



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3 (1410020-03) Air Sampled: Oct-16-14 10:00 Received: Oct-16-14 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Methyl methacrylate	U			0.0250	ppbv	1	B410068	Oct-16-14	Oct-16-14
1,4-Dioxane	U			0.0250	"	"	"	"	"
cis-1,3-Dichloropropene	U			0.0250	"	"	"	"	"
4-Methyl-2-pentanone	0.0492	K		0.0250	"	"	"	"	"
trans-1,3-Dichloropropene	U			0.0250	"	"	"	"	"
1,1,2-Trichloroethane	U			0.0250	"	"	"	"	"
Dibromochloromethane	U			0.0250	"	"	"	"	"
Toluene	0.419			0.0250	"	"	"	"	"
2-Hexanone	U			0.0250	"	"	"	"	"
1,2-Dibromoethane (EDB)	U			0.0250	"	"	"	"	"
Tetrachloroethene	U			0.0250	"	"	"	"	"
Chlorobenzene	U			0.0250	"	"	"	"	"
Ethylbenzene	0.0642			0.0250	"	"	"	"	"
m+p-Xylene	0.210			0.0500	"	"	"	"	"
Bromoform	U			0.0250	"	"	"	"	"
Styrene	U			0.0250	"	"	"	"	"
1,1,2,2-Tetrachloroethane	U			0.0250	"	"	"	"	"
o-Xylene	0.0756			0.0250	"	"	"	"	"
4-ethyltoluene	0.0674	K		0.0250	"	"	"	"	"
1,3,5-Trimethylbenzene	U			0.0250	"	"	"	"	"
1,2,4-Trimethylbenzene	0.0662			0.0250	"	"	"	"	"
1,3-Dichlorobenzene	U			0.0250	"	"	"	"	"
Benzyl chloride	U			0.0250	"	"	"	"	"
1,4-Dichlorobenzene	U			0.0250	"	"	"	"	"
1,2-Dichlorobenzene	U			0.0250	"	"	"	"	"
Hexachlorobutadiene	U			0.0250	"	"	"	"	"
1,2,4-Trichlorobenzene	U			0.0250	"	"	"	"	"
Naphthalene	0.547	BC, J		0.0250	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
Surrogate: Dichlorodifluoromethane	0.480	J	91%	90-120	"	"	"
Surrogate: Dichlorotetrafluoroethane	0.0228	J	114%	80-120	"	"	"
Surrogate: Trichlorofluoromethane	0.230		96%	90-120	"	"	"
Surrogate: 1,1,2-trichloro-1,2,2-trifluoroethane (F)	0.0844		116%	90-120	"	"	"
Surrogate: 1,1,1-Trichloroethane	3.87E-3	J	77%	80-120	"	"	"
Surrogate: Carbon tetrachloride	0.0935		109%	80-120	"	"	"



Environmental Protection Agency Region 5
Chicago Regional Laboratory

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Air Division, US EPA Region 5
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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-21-15 11:50

Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

2 (1410020-04) Air Sampled: Oct-16-14 10:30 Received: Oct-16-14 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Propene	1.69	K		0.0500	ppbv	1	B410068	Oct-16-14	Oct-16-14
Chloromethane	0.517			0.0250	"	"	"	"	"
Vinyl chloride	U			0.0250	"	"	"	"	"
1,3-butadiene	0.0428	K		0.0250	"	"	"	"	"
Bromomethane	U			0.0250	"	"	"	"	"
Chloroethane	U			0.0250	"	"	"	"	"
Ethanol	1.22	J		0.0250	"	"	"	"	"
Acrolein	0.558	J, K		0.0250	"	"	"	"	"
Isopropyl alcohol	0.593	J		0.0250	"	"	"	"	"
1,1-Dichloroethene	U			0.0250	"	"	"	"	"
Methylene chloride	0.102			0.0250	"	"	"	"	"
Carbon disulfide	Rejected			0.0250	"	"	"	"	"
Methyl tert-butyl ether	U			0.0250	"	"	"	"	"
1,1-Dichloroethane	U			0.0250	"	"	"	"	"
Vinyl acetate	U			0.0250	"	"	"	"	"
Hexane	0.361			0.0250	"	"	"	"	"
2-Butanone	0.322			0.0500	"	"	"	"	"
cis-1,2-Dichloroethene	U			0.0250	"	"	"	"	"
trans-1,2-Dichloroethene	U			0.0250	"	"	"	"	"
Chloroform	U			0.0250	"	"	"	"	"
Ethyl acetate	0.127			0.0250	"	"	"	"	"
1,2-Dichloroethane	0.0256			0.0250	"	"	"	"	"
Cyclohexane	0.340			0.0500	"	"	"	"	"
Tetrahydrofuran	U			0.0250	"	"	"	"	"
Benzene	0.287			0.0250	"	"	"	"	"
n-Heptane	0.196			0.0250	"	"	"	"	"
1,2-Dichloropropane	U			0.0250	"	"	"	"	"
Trichloroethene	U			0.0250	"	"	"	"	"
Bromodichloromethane	U			0.0250	"	"	"	"	"
Methyl methacrylate	U			0.0250	"	"	"	"	"
1,4-Dioxane	U			0.0250	"	"	"	"	"
cis-1,3-Dichloropropene	U			0.0250	"	"	"	"	"
4-Methyl-2-pentanone	0.0396	K		0.0250	"	"	"	"	"
trans-1,3-Dichloropropene	U			0.0250	"	"	"	"	"
1,1,2-Trichloroethane	U			0.0250	"	"	"	"	"
Dibromochloromethane	U			0.0250	"	"	"	"	"



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
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Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

2 (1410020-04) Air Sampled: Oct-16-14 10:30 Received: Oct-16-14 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Toluene	0.519			0.0250	ppbv	1	B410068	Oct-16-14	Oct-16-14
2-Hexanone	U			0.0250	"	"	"	"	"
1,2-Dibromoethane (EDB)	U			0.0250	"	"	"	"	"
Tetrachloroethene	U			0.0250	"	"	"	"	"
Chlorobenzene	U			0.0250	"	"	"	"	"
Ethylbenzene	0.0758			0.0250	"	"	"	"	"
m+p-Xylene	0.242			0.0500	"	"	"	"	"
Bromoform	U			0.0250	"	"	"	"	"
Styrene	U			0.0250	"	"	"	"	"
1,1,2,2-Tetrachloroethane	U			0.0250	"	"	"	"	"
o-Xylene	0.0835			0.0250	"	"	"	"	"
4-ethyltoluene	0.0752	K		0.0250	"	"	"	"	"
1,3,5-Trimethylbenzene	U			0.0250	"	"	"	"	"
1,2,4-Trimethylbenzene	0.0715			0.0250	"	"	"	"	"
1,3-Dichlorobenzene	U			0.0250	"	"	"	"	"
Benzyl chloride	U			0.0250	"	"	"	"	"
1,4-Dichlorobenzene	U			0.0250	"	"	"	"	"
1,2-Dichlorobenzene	U			0.0250	"	"	"	"	"
Hexachlorobutadiene	U			0.0250	"	"	"	"	"
1,2,4-Trichlorobenzene	U			0.0250	"	"	"	"	"
Naphthalene	0.665	J		0.0250	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
Surrogate: Dichlorodifluoromethane	0.459	J	88%	90-120	"	"	"
Surrogate: Dichlorotetrafluoroethane	0.0244	J	122%	80-120	"	"	"
Surrogate: Trichlorofluoromethane	0.230		96%	90-120	"	"	"
Surrogate: 1,1,2-trichloro-1,2,2-trifluoroethane (F)	0.0847		116%	90-120	"	"	"
Surrogate: 1,1,1-Trichloroethane	3.90E-3	J	78%	80-120	"	"	"
Surrogate: Carbon tetrachloride	0.0926		108%	80-120	"	"	"



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-21-15 11:50

Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

2 (1410020-04RE1) Air Sampled: Oct-16-14 10:30 Received: Oct-16-14 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Acetone	3.84	J		0.250	ppbv	5	B410068	Oct-16-14	Oct-16-14

2 (1410020-05) Air Sampled: Oct-16-14 10:30 Received: Oct-16-14 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Propene	1.65	K		0.0500	ppbv	1	B410068	Oct-16-14	Oct-16-14
Chloromethane	0.518			0.0250	"	"	"	"	"
Vinyl chloride	U			0.0250	"	"	"	"	"
1,3-butadiene	0.0423	K		0.0250	"	"	"	"	"
Bromomethane	U			0.0250	"	"	"	"	"
Chloroethane	U			0.0250	"	"	"	"	"
Ethanol	1.35	J		0.0250	"	"	"	"	"
Acrolein	0.583	J, K		0.0250	"	"	"	"	"
Isopropyl alcohol	0.348	J		0.0250	"	"	"	"	"
1,1-Dichloroethene	U			0.0250	"	"	"	"	"
Methylene chloride	0.104			0.0250	"	"	"	"	"
Carbon disulfide	Rejected			0.0250	"	"	"	"	"
Methyl tert-butyl ether	U			0.0250	"	"	"	"	"
1,1-Dichloroethane	U			0.0250	"	"	"	"	"
Vinyl acetate	U			0.0250	"	"	"	"	"
Hexane	0.357			0.0250	"	"	"	"	"
2-Butanone	0.340			0.0500	"	"	"	"	"
cis-1,2-Dichloroethene	U			0.0250	"	"	"	"	"
trans-1,2-Dichloroethene	U			0.0250	"	"	"	"	"
Chloroform	0.0319			0.0250	"	"	"	"	"
Ethyl acetate	0.125			0.0250	"	"	"	"	"
1,2-Dichloroethane	U			0.0250	"	"	"	"	"
Cyclohexane	0.334			0.0500	"	"	"	"	"
Tetrahydrofuran	U			0.0250	"	"	"	"	"
Benzene	0.284			0.0250	"	"	"	"	"
n-Heptane	0.191			0.0250	"	"	"	"	"
1,2-Dichloropropane	U			0.0250	"	"	"	"	"
Trichloroethene	U			0.0250	"	"	"	"	"
Bromodichloromethane	U			0.0250	"	"	"	"	"
Methyl methacrylate	U			0.0250	"	"	"	"	"



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-21-15 11:50

Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

2 (1410020-05) Air Sampled: Oct-16-14 10:30 Received: Oct-16-14 11:00

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
1,4-Dioxane	U			0.0250	ppbv	1	B410068	Oct-16-14	Oct-16-14
cis-1,3-Dichloropropene	U			0.0250	"	"	"	"	"
4-Methyl-2-pentanone	0.0378	K		0.0250	"	"	"	"	"
trans-1,3-Dichloropropene	U			0.0250	"	"	"	"	"
1,1,2-Trichloroethane	U			0.0250	"	"	"	"	"
Dibromochloromethane	U			0.0250	"	"	"	"	"
Toluene	0.514			0.0250	"	"	"	"	"
2-Hexanone	0.0284			0.0250	"	"	"	"	"
1,2-Dibromoethane (EDB)	U			0.0250	"	"	"	"	"
Tetrachloroethene	U			0.0250	"	"	"	"	"
Chlorobenzene	U			0.0250	"	"	"	"	"
Ethylbenzene	0.0751			0.0250	"	"	"	"	"
m+p-Xylene	0.241			0.0500	"	"	"	"	"
Bromoform	U			0.0250	"	"	"	"	"
Styrene	0.0267			0.0250	"	"	"	"	"
1,1,2,2-Tetrachloroethane	U			0.0250	"	"	"	"	"
o-Xylene	0.0920			0.0250	"	"	"	"	"
4-ethyltoluene	0.0735	K		0.0250	"	"	"	"	"
1,3,5-Trimethylbenzene	U			0.0250	"	"	"	"	"
1,2,4-Trimethylbenzene	0.0705			0.0250	"	"	"	"	"
1,3-Dichlorobenzene	U			0.0250	"	"	"	"	"
Benzyl chloride	U			0.0250	"	"	"	"	"
1,4-Dichlorobenzene	U			0.0250	"	"	"	"	"
1,2-Dichlorobenzene	U			0.0250	"	"	"	"	"
Hexachlorobutadiene	U			0.0250	"	"	"	"	"
1,2,4-Trichlorobenzene	U			0.0250	"	"	"	"	"
Naphthalene	0.675	J		0.0250	"	"	"	"	"

Surogate	Result		%REC	%REC Limits	Batch	Prepared	Analyzed
Surrogate: Dichlorodifluoromethane	0.454	J	87%	90-120	"	"	"
Surrogate: Dichlorotetrafluoroethane	0.0234	J	117%	80-120	"	"	"
Surrogate: Trichlorofluoromethane	0.227		95%	90-120	"	"	"
Surrogate: 1,1,2-trichloro-1,2,2-trifluoroethane (F)	0.0849		116%	90-120	"	"	"
Surrogate: 1,1,1-Trichloroethane	3.79E-3	J	76%	80-120	"	"	"
Surrogate: Carbon tetrachloride	0.0912		106%	80-120	"	"	"



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Chicago Regional Laboratory

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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-21-15 11:50

Air Toxics by GC/MS, EPA TO-15 (modified)
US EPA Region 5 Chicago Regional Laboratory

2 (1410020-05RE1) Air **Sampled: Oct-16-14 10:30** **Received: Oct-16-14 11:00**

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed
Acetone	3.25	J		0.250	ppbv	5	B410068	Oct-16-14	Oct-16-14



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-21-15 11:50

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B410068 - ColdTrap Dehydration

Blank (B410068-BLK1)

Prepared & Analyzed: Oct-16-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Propene	0.0712			0.0500	ppbv						
Chloromethane	U			0.0250	"						
Vinyl chloride	U			0.0250	"						
1,3-butadiene	U			0.0250	"						
Bromomethane	U			0.0250	"						
Chloroethane	U			0.0250	"						
Ethanol	0.165	J		0.0250	"						
Acrolein	U	J		0.0250	"						
Isopropyl alcohol	U	J		0.0250	"						
Acetone	0.0971	J		0.0500	"						
1,1-Dichloroethene	U			0.0250	"						
Methylene chloride	U			0.0250	"						
Carbon disulfide	Rejected			0.0250	"						
Methyl tert-butyl ether	U			0.0250	"						
1,1-Dichloroethane	U			0.0250	"						
Vinyl acetate	U			0.0250	"						
Hexane	U			0.0250	"						
2-Butanone	U			0.0500	"						
cis-1,2-Dichloroethene	U			0.0250	"						
trans-1,2-Dichloroethene	U			0.0250	"						
Chloroform	U			0.0250	"						
Ethyl acetate	U			0.0250	"						
1,2-Dichloroethane	U			0.0250	"						
Cyclohexane	U			0.0500	"						
Tetrahydrofuran	U			0.0250	"						
Benzene	U			0.0250	"						
n-Heptane	U			0.0250	"						
1,2-Dichloropropane	U			0.0250	"						
Trichloroethene	U			0.0250	"						
Bromodichloromethane	U			0.0250	"						
Methyl methacrylate	U			0.0250	"						
1,4-Dioxane	U			0.0250	"						
cis-1,3-Dichloropropene	U			0.0250	"						



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Reported:
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Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B410068 - ColdTrap Dehydration

Blank (B410068-BLK1)

Prepared & Analyzed: Oct-16-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
4-Methyl-2-pentanone	U			0.0250	ppbv					
trans-1,3-Dichloropropene	U			0.0250	"					
1,1,2-Trichloroethane	U			0.0250	"					
Dibromochloromethane	U			0.0250	"					
Toluene	0.0418			0.0250	"					
2-Hexanone	U			0.0250	"					
1,2-Dibromoethane (EDB)	U			0.0250	"					
Tetrachloroethene	U			0.0250	"					
Chlorobenzene	U			0.0250	"					
Ethylbenzene	U			0.0250	"					
m+p-Xylene	U			0.0500	"					
Bromoform	U			0.0250	"					
Styrene	U			0.0250	"					
1,1,2,2-Tetrachloroethane	U			0.0250	"					
o-Xylene	U			0.0250	"					
4-ethyltoluene	U			0.0250	"					
1,3,5-Trimethylbenzene	U			0.0250	"					
1,2,4-Trimethylbenzene	U			0.0250	"					
1,3-Dichlorobenzene	U			0.0250	"					
Benzyl chloride	U			0.0250	"					
1,4-Dichlorobenzene	U			0.0250	"					
1,2-Dichlorobenzene	U			0.0250	"					
Hexachlorobutadiene	U			0.0250	"					
1,2,4-Trichlorobenzene	U			0.0250	"					
Naphthalene	0.108	J		0.0250	"					
Surrogate: Dichlorodifluoromethane	U	J			"	0.5250		1%	90-120	
Surrogate: Dichlorotetrafluoroethane	U				"	2.000E-2		%	80-120	
Surrogate: Trichlorofluoromethane	U				"	0.2390		%	90-120	
Surrogate:	U				"	7.300E-2		%	90-120	
1,1,2-trichloro-1,2,2-trifluoroethane (Freon										
Surrogate: 1,1,1-Trichloroethane	U				"	5.000E-3		%	80-120	
Surrogate: Carbon tetrachloride	U				"	8.600E-2		%	80-120	



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-21-15 11:50

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B410068 - ColdTrap Dehydration

LCS (B410068-BS1)

Prepared & Analyzed: Oct-16-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
Propene	0.484			0.0500	ppbv	0.5000		97% 76-112		
Chloromethane	0.505			0.0250	"	0.5000		101% 77.6-116		
Vinyl chloride	0.511			0.0250	"	0.5000		102% 77.4-117		
1,3-butadiene	0.488			0.0250	"	0.5000		98% 77.7-115		
Bromomethane	0.522			0.0250	"	0.5000		104% 75.2-117		
Chloroethane	0.504			0.0250	"	0.5000		101% 79.8-114		
Ethanol	0.751	J		0.0250	"	0.5000		150% 50-124		
Acrolein	0.822	J		0.0250	"	0.5000		164% 67.9-130		
Isopropyl alcohol	0.500	J		0.0250	"	0.5000		100% 81-106		
Acetone	0.956	J		0.0500	"	0.5000		191% 60-137		
1,1-Dichloroethene	0.543			0.0250	"	0.5000		109% 77.3-118		
Methylene chloride	0.528			0.0250	"	0.5000		106% 78.7-117		
Carbon disulfide	Rejected			0.0250	"	0.5000		203% 53-140		
Methyl tert-butyl ether	0.512			0.0250	"	0.5000		102% 79.1-118		
1,1-Dichloroethane	0.516			0.0250	"	0.5000		103% 79.8-117		
Vinyl acetate	0.545			0.0250	"	0.5000		109% 85-106		
Hexane	0.494			0.0250	"	0.5000		99% 70.1-121		
2-Butanone	0.560			0.0500	"	0.5000		112% 82-108		
cis-1,2-Dichloroethene	0.537			0.0250	"	0.5000		107% 78.1-115		
trans-1,2-Dichloroethene	0.535			0.0250	"	0.5000		107% 0-200		
Chloroform	0.527			0.0250	"	0.5000		105% 79.6-115		
Ethyl acetate	0.555			0.0250	"	0.5000		111% 0-200		
1,2-Dichloroethane	0.525			0.0250	"	0.5000		105% 79.8-115		
Cyclohexane	0.554			0.0500	"	0.5000		111% 72.5-119		
Tetrahydrofuran	0.527			0.0250	"	0.5000		105% 0-200		
Benzene	0.557			0.0250	"	0.5000		111% 75.7-118		
n-Heptane	0.498			0.0250	"	0.5000		100% 66.9-152		
1,2-Dichloropropane	0.520			0.0250	"	0.5000		104% 76.8-118		
Trichloroethene	0.502			0.0250	"	0.5000		100% 70.1-119		
Bromodichloromethane	0.547			0.0250	"	0.5000		109% 75.8-117		
Methyl methacrylate	0.529			0.0250	"	0.5000		106% 0-200		
1,4-Dioxane	0.506			0.0250	"	0.5000		101% 54.7-150		
cis-1,3-Dichloropropene	0.583			0.0250	"	0.5000		117% 75.5-115		
4-Methyl-2-pentanone	0.501			0.0250	"	0.5000		100% 62.9-133		



Environmental Protection Agency Region 5
Chicago Regional Laboratory

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Chicago IL, 60605

Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-21-15 11:50

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B410068 - ColdTrap Dehydration

LCS (B410068-BS1)

Prepared & Analyzed: Oct-16-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
trans-1,3-Dichloropropene	0.553			0.0250	ppbv	0.5000		111% 75.8-117		
1,1,2-Trichloroethane	0.514			0.0250	"	0.5000		103% 92.3-106		
Dibromochloromethane	0.564			0.0250	"	0.5000		113% 69-132		
Toluene	0.577			0.0250	"	0.5000		115% 73.2-120		
2-Hexanone	0.538			0.0250	"	0.5000		108% 76-110		
1,2-Dibromoethane (EDB)	0.553			0.0250	"	0.5000		111% 75.5-118		
Tetrachloroethene	0.523			0.0250	"	0.5000		105% 67.1-125		
Chlorobenzene	0.522			0.0250	"	0.5000		104% 68.5-121		
Ethylbenzene	0.494			0.0250	"	0.5000		99% 74.9-118		
m+p-Xylene	0.987			0.0500	"	1.000		99% 79.8-121		
Bromoform	0.509			0.0250	"	0.5000		102% 72.4-119		
Styrene	0.440			0.0250	"	0.5000		88% 71.5-122		
1,1,2,2-Tetrachloroethane	0.508			0.0250	"	0.5000		102% 92-106		
o-Xylene	0.489			0.0250	"	0.5000		98% 77.6-124		
4-ethyltoluene	0.484			0.0250	"	0.5000		97% 96.7-122		
1,3,5-Trimethylbenzene	0.470			0.0250	"	0.5000		94% 74.4-121		
1,2,4-Trimethylbenzene	0.480			0.0250	"	0.5000		96% 71.9-126		
1,3-Dichlorobenzene	0.492			0.0250	"	0.5000		98% 67.9-132		
Benzyl chloride	0.536			0.0250	"	0.5000		107% 60.7-134		
1,4-Dichlorobenzene	0.487			0.0250	"	0.5000		97% 65.4-136		
1,2-Dichlorobenzene	0.508			0.0250	"	0.5000		102% 69.3-129		
Hexachlorobutadiene	0.554			0.0250	"	0.5000		111% 8.45-161		
1,2,4-Trichlorobenzene	0.623			0.0250	"	0.5000		125% 39.7-186		
Naphthalene	0.852	J		0.0250	"			40-200		
Surrogate: Dichlorodifluoromethane	0.485				"	0.5000		97% 77.8-116		
Surrogate: Dichlorotetrafluoroethane	0.472				"	0.5000		94% 89-108		
Surrogate: Trichlorofluoromethane	0.520				"	0.5000		104% 78.6-114		
Surrogate:	0.502				"	0.5000		100% 75.3-119		
1,1,2-trichloro-1,2,2-trifluoroethane (Freon										
Surrogate: 1,1,1-Trichloroethane	0.532				"	0.5000		106% 92.5-105		
Surrogate: Carbon tetrachloride	0.542				"	0.5000		108% 76.3-118		



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-21-15 11:50

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control US EPA Region 5 Chicago Regional Laboratory

Batch B410068 - ColdTrap Dehydration

LCS Dup (B410068-BSD1)

Prepared & Analyzed: Oct-16-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
Propene	0.370			0.0500	ppbv	0.5000		74% 76-112	27	19.6
Chloromethane	0.488			0.0250	"	0.5000		98% 77.6-116	3	26.9
Vinyl chloride	0.462			0.0250	"	0.5000		92% 77.4-117	10	25.1
1,3-butadiene	0.410			0.0250	"	0.5000		82% 77.7-115	17	33.2
Bromomethane	0.506			0.0250	"	0.5000		101% 75.2-117	3	26.6
Chloroethane	0.485			0.0250	"	0.5000		97% 79.8-114	4	29.5
Ethanol	0.652	J		0.0250	"	0.5000		130% 50-124	14	200
Acrolein	0.746	J		0.0250	"	0.5000		149% 67.9-130	10	29.8
Isopropyl alcohol	0.471	J		0.0250	"	0.5000		94% 81-106	6	25
Acetone	1.09	J		0.0500	"	0.5000		217% 60-137	13	28.7
1,1-Dichloroethene	0.508			0.0250	"	0.5000		102% 77.3-118	7	15.9
Methylene chloride	0.526			0.0250	"	0.5000		105% 78.7-117	0.5	20.7
Carbon disulfide	Rejected			0.0250	"	0.5000		130% 53-140	44	200
Methyl tert-butyl ether	0.467			0.0250	"	0.5000		93% 79.1-118	9	31.9
1,1-Dichloroethane	0.506			0.0250	"	0.5000		101% 79.8-117	2	13.1
Vinyl acetate	0.480			0.0250	"	0.5000		96% 85-106	13	200
Hexane	0.464			0.0250	"	0.5000		93% 70.1-121	6	43.5
2-Butanone	0.613			0.0500	"	0.5000		123% 82-108	9	25
cis-1,2-Dichloroethene	0.510			0.0250	"	0.5000		102% 78.1-115	5	29.6
trans-1,2-Dichloroethene	0.512			0.0250	"	0.5000		102% 0-200	4	25
Chloroform	0.558			0.0250	"	0.5000		112% 79.6-115	6	25.2
Ethyl acetate	0.524			0.0250	"	0.5000		105% 0-200	6	25
1,2-Dichloroethane	0.555			0.0250	"	0.5000		111% 79.8-115	6	24.6
Cyclohexane	0.552			0.0500	"	0.5000		110% 72.5-119	0.3	34.5
Tetrahydrofuran	0.526			0.0250	"	0.5000		105% 0-200	0.2	25
Benzene	0.555			0.0250	"	0.5000		111% 75.7-118	0.4	27.4
n-Heptane	0.486			0.0250	"	0.5000		97% 66.9-152	3	25
1,2-Dichloropropane	0.577			0.0250	"	0.5000		115% 76.8-118	10	25.3
Trichloroethene	0.540			0.0250	"	0.5000		108% 70.1-119	7	34.1
Bromodichloromethane	0.608			0.0250	"	0.5000		122% 75.8-117	11	26.5
Methyl methacrylate	0.543			0.0250	"	0.5000		109% 0-200	3	200
1,4-Dioxane	0.540			0.0250	"	0.5000		108% 54.7-150	6	58.6
cis-1,3-Dichloropropene	0.591			0.0250	"	0.5000		118% 75.5-115	1	31.1
4-Methyl-2-pentanone	0.487			0.0250	"	0.5000		97% 62.9-133	3	42



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Chicago Regional Laboratory

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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-21-15 11:50

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B410068 - ColdTrap Dehydration

LCS Dup (B410068-BSD1)

Prepared & Analyzed: Oct-16-14

Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit
trans-1,3-Dichloropropene	0.567			0.0250	ppbv	0.5000		113% 75.8-117	2	31.7
1,1,2-Trichloroethane	0.570			0.0250	"	0.5000		114% 92.3-106	10	11.5
Dibromochloromethane	0.627			0.0250	"	0.5000		125% 69-132	10	25
Toluene	0.567			0.0250	"	0.5000		113% 73.2-120	2	30.6
2-Hexanone	0.525			0.0250	"	0.5000		105% 76-110	2	46.8
1,2-Dibromoethane (EDB)	0.594			0.0250	"	0.5000		119% 75.5-118	7	31.5
Tetrachloroethene	0.572			0.0250	"	0.5000		114% 67.1-125	9	13.8
Chlorobenzene	0.539			0.0250	"	0.5000		108% 68.5-121	3	31.9
Ethylbenzene	0.499			0.0250	"	0.5000		100% 74.9-118	1	31.6
m+p-Xylene	0.984			0.0500	"	1.000		98% 79.8-121	0.3	28.9
Bromoform	0.556			0.0250	"	0.5000		111% 72.4-119	9	34.6
Styrene	0.481			0.0250	"	0.5000		96% 71.5-122	9	19.7
1,1,2,2-Tetrachloroethane	0.568			0.0250	"	0.5000		114% 92-106	11	11.5
o-Xylene	0.491			0.0250	"	0.5000		98% 77.6-124	0.3	28.7
4-ethyltoluene	0.482			0.0250	"	0.5000		96% 96.7-122	0.5	25
1,3,5-Trimethylbenzene	0.468			0.0250	"	0.5000		94% 74.4-121	0.4	29.8
1,2,4-Trimethylbenzene	0.479			0.0250	"	0.5000		96% 71.9-126	0.4	32.1
1,3-Dichlorobenzene	0.520			0.0250	"	0.5000		104% 67.9-132	5	37.9
Benzyl chloride	0.513			0.0250	"	0.5000		103% 60.7-134	4	48.3
1,4-Dichlorobenzene	0.519			0.0250	"	0.5000		104% 65.4-136	6	39.6
1,2-Dichlorobenzene	0.528			0.0250	"	0.5000		106% 69.3-129	4	34
Hexachlorobutadiene	0.596			0.0250	"	0.5000		119% 8.45-161	7	25
1,2,4-Trichlorobenzene	0.565			0.0250	"	0.5000		113% 39.7-186	10	77.1
Naphthalene	0.651	J		0.0250	"			40-200	27	200
Surrogate: Dichlorodifluoromethane	0.480				"	0.5000		96% 77.8-116		
Surrogate: Dichlorotetrafluoroethane	0.473				"	0.5000		95% 89-108		
Surrogate: Trichlorofluoromethane	0.512				"	0.5000		102% 78.6-114		
Surrogate:	0.495				"	0.5000		99% 75.3-119		
1,1,2-trichloro-1,2,2-trifluoroethane (Freon)										
Surrogate: 1,1,1-Trichloroethane	0.560				"	0.5000		112% 92.5-105		
Surrogate: Carbon tetrachloride	0.574				"	0.5000		115% 76.3-118		



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-21-15 11:50

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B410068 - ColdTrap Dehydration

Duplicate (B410068-DUP1)		Source: 1410020-01		Prepared & Analyzed: Oct-16-14							
Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Propene	0.937	K		0.0500	ppbv		1.08			14	30
Chloromethane	0.536			0.0250	"		0.532			0.7	30
Vinyl chloride	U			0.0250	"		U				30
1,3-butadiene	0.0412	K		0.0250	"		0.0406			2	30
Bromomethane	7.52E-3			0.0250	"		7.57E-3			0.7	30
Chloroethane	9.95E-3			0.0250	"		7.69E-3			26	30
Ethanol	1.15	J		0.0250	"		1.36			17	40
Acrolein	0.475	J, K		0.0250	"		0.516			8	40
Isopropyl alcohol	3.62	J		0.0250	"		3.85			6	40
Acetone	2.64	J		0.0500	"		2.86			8	40
1,1-Dichloroethene	U			0.0250	"		U				30
Methylene chloride	0.129	BC		0.0250	"		0.134			4	30
Carbon disulfide	Rejected			0.0250	"		Rejected			0.1	40
Methyl tert-butyl ether	U			0.0250	"		U				40
1,1-Dichloroethane	U			0.0250	"		U				30
Vinyl acetate	U			0.0250	"		9.15E-3				40
Hexane	0.284			0.0250	"		0.307			8	30
2-Butanone	0.331			0.0500	"		0.339			3	50
cis-1,2-Dichloroethene	U			0.0250	"		U				30
trans-1,2-Dichloroethene	5.89E-3			0.0250	"		6.96E-3			17	30
Chloroform	0.0364			0.0250	"		0.0268			30	30
Ethyl acetate	0.158			0.0250	"		0.157			0.6	40
1,2-Dichloroethane	0.0123			0.0250	"		0.0110			11	30
Cyclohexane	0.222			0.0500	"		0.195			13	30
Tetrahydrofuran	U			0.0250	"		U				40
Benzene	0.230			0.0250	"		0.235			2	30
n-Heptane	0.134			0.0250	"		0.136			2	30
1,2-Dichloropropane	U			0.0250	"		U				30
Trichloroethene	U			0.0250	"		U				30
Bromodichloromethane	U			0.0250	"		U				30
Methyl methacrylate	U			0.0250	"		U				40
1,4-Dioxane	0.0153			0.0250	"		U				40
cis-1,3-Dichloropropene	U			0.0250	"		U				30
4-Methyl-2-pentanone	0.0330	K		0.0250	"		0.0420			24	40



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-21-15 11:50

Air Toxics by GC/MS, EPA TO-15 (modified) - Quality Control
US EPA Region 5 Chicago Regional Laboratory

Batch B410068 - ColdTrap Dehydration

Duplicate (B410068-DUP1)		Source: 1410020-01		Prepared & Analyzed: Oct-16-14							
Analyte	Result	Flags / Qualifiers	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	
trans-1,3-Dichloropropene	U	BC		0.0250	ppbv		U			30	
1,1,2-Trichloroethane	U			0.0250	"		U			30	
Dibromochloromethane	U			0.0250	"		U			30	
Toluene	0.438			0.0250	"		0.450		3	30	
2-Hexanone	U			0.0250	"		U			40	
1,2-Dibromoethane (EDB)	U			0.0250	"		U			30	
Tetrachloroethene	0.0142			0.0250	"		0.0146		3	30	
Chlorobenzene	U			0.0250	"		U			30	
Ethylbenzene	0.0494			0.0250	"		0.0528		7	30	
m+p-Xylene	0.162			0.0500	"		0.162		0.2	30	
Bromoform	U	K		0.0250	"		U			30	
Styrene	0.0290			0.0250	"		0.0256		13	30	
1,1,2,2-Tetrachloroethane	U			0.0250	"		U			30	
o-Xylene	0.0592			0.0250	"		0.0604		2	30	
4-ethyltoluene	0.0559			0.0250	"		0.0558		0.2	30	
1,3,5-Trimethylbenzene	0.0163			0.0250	"		0.0160		2	30	
1,2,4-Trimethylbenzene	0.0534			0.0250	"		0.0529		0.9	30	
1,3-Dichlorobenzene	U			0.0250	"		U			30	
Benzyl chloride	U			0.0250	"		U			30	
1,4-Dichlorobenzene	U			0.0250	"		U			30	
1,2-Dichlorobenzene	U	BC, J		0.0250	"		U			30	
Hexachlorobutadiene	U			0.0250	"		U			30	
1,2,4-Trichlorobenzene	U			0.0250	"		U			30	
Naphthalene	0.648			0.0250	"		0.622		4	30	
Surrogate: Dichlorodifluoromethane	0.509		J			"	0.5250		97%	90-120	
Surrogate: Dichlorotetrafluoroethane	0.0249		J			"	2.000E-2		125%	80-120	
Surrogate: Trichlorofluoromethane	0.238					"	0.2390		100%	90-120	
Surrogate:	0.0894					"	7.300E-2		123%	90-120	
1,1,2-trichloro-1,2,2-trifluoroethane (Freon											
Surrogate: 1,1,1-Trichloroethane	4.00E-3		J			"	5.000E-3		80%	80-120	
Surrogate: Carbon tetrachloride	0.0933				"	8.600E-2		108%	80-120		



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Project: BP Whiting Refinery
Project Number: [none]
Project Manager: Motria Caudill

Reported:
Jan-21-15 11:50

Notes and Definitions

R	Rejected
K	The identification of the analyte is acceptable; the reported value may be biased high. The actual value is expected to be less than the reported value.
J	The identification of the analyte is acceptable; the reported value is an estimate.
BC	Analyte is detected in the sample within 5x the amount detected in the canister certification blank and may have a high bias from residual contamination in the canister used to sample.
U	Not Detected
NR	Not Reported